Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:

Pacific Hake - Growth and natal origin of Pacific hake from the Georgia Basin DPS

1.2. Summary description of the data:

Pacific hake (Merluccius productus) is an abundant species residing along the Pacific coast from the Gulf of California to the Strait of Georgia. It is the most common groundfish in the California Current ecosystem (Helser et al. 2008). In Puget Sound, however, Pacific hake populations have declined dramatically in the past three decades (Figure 1), leading to a closure of the fishery in 1990 (Gustafson et al. 2000) and a designation by NOAA Fisheries as a Species of Concern in 1999. Because Pacific hake feed on a variety of fishes and invertebrates, and are an important prey item (for sea lions, small cetaceans, and dogfish sharks), the decline of this mid-trophic level component has important ramifications for the functioning of the Puget Sound ecosystem.

Puget Sound Pacific hake are classified as part of the Georgia Basin Distinct Population Segment (DPS), which is discrete from the highly migratory coastal DPS (Figure 2a). The Biological Review Team (BRT) that reviewed the status of the Georgia Basin DPS noted that in addition to the decline in Puget Sound hake abundance, another cause for concern was a marked decrease in mean hake size and age at maturity (Gustafson et al. 2000). In contrast, these patterns were not observed as strongly in the Strait of Georgia populations (King and McFarlane 2006), which are also part of the Georgia Basin DPS. The BRT were also concerned by uncertainties in the extent of mixing among stocks of the Georgia Basin DPS (Gustafson et al. 2000). This issue is important because if mixing is limited, then the problems faced by the Puget Sound stock are more important for its potential recovery.

Puget Sound hake spawn in large aggregations in a few distinct locations, which are associated with sources of freshwater. Unfortunately these sites occur in somewhat degraded areas, particularly with regard to oxygen concentration. Therefore we hypothesize that the hypoxic and otherwise degraded conditions of these spawning areas have led to depressed juvenile growth, which in turn can have detrimental consequences for the population. Woodbury et al. (1995) found that juvenile growth of

the coastal stock varied from year to year and was likely related to environmental conditions. They also speculated that year-class strength might be related to early juvenile growth.

Another goal of the proposed research is to produce an indicator for the Puget Sound marine ecosystem in order to aid in the ongoing development of an Integrated Ecosystem Assessment (IEA) for Puget Sound, which is a high priority for NOAA. Ecosystem indicators should be grounded in the ecology of the system, and juvenile hake growth suits this perfectly because it is not only a reflection of the state of the ecosystem, but is also reflects the viability of an integral component of the ecosystem.

This proposal represents a continuation of a project we initiated last year. In our first year of research, funded by a Species of Concern grant, we obtained the following findings:

1) Otoliths sampled from recent years at the Port Susan spawning site demonstrated much reduced growth rates in the first and second years compared to otoliths sampled there 3 decades ago (Figure 3).

2) The chemical signatures of otolith edges (corresponding to the time when fish were sampled) of fish sampled from the Port Susan spawning site demonstrated strong consistency from year to year. This will enhance our ability to associate adults with their natal origin.

3) The chemical signatures of otolith cores (corresponding to natal areas) demonstrated the potential existence of at least 3 separate sources for adults sampled at the Port Susan site (Fig. 5).

Here we propose to continue this research. In particular, due to staffing issues at DFO, we were not able to obtain archived otolith samples from the Strait of Georgia, which represent an important contrast for the Puget Sound population. We anticipate receiving these otoliths shortly, and.

1.3. Is this a one-time data collection, or an ongoing series of measurements?
One-time data collection

1.4. Actual or planned temporal coverage of the data:
2010-02-01 to 2012-01-31, 2010-02-01 to 2012-01-31

1.5. Actual or planned geographic coverage of the data:
W: -122.2687, E: -122.2687, N: 47.9865, S: 47.9865
Port Susan, WA

W: -123.5046, E: -123.5046, N: 49.2788, S: 49.2788
Georgia Strait, BC

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
Table (digital)

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)
Instrument: Instrument Not Applicable
Platform: Platform Not Applicable
Physical Collection / Fishing Gear: Not Applicable

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
Northwest Fisheries Science Center (NWFSC)

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:
Northwest Fisheries Science Center (NWFSC)

2.4. E-mail address:
nmfs.nwfsc.metadata@noaa.gov

2.5. Phone number:
206-860-3200

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:
Paul Chittaro

3.2. Title:
Data Steward

4. Resources
Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?
No

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5

5. Data Lineage and Quality

NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible

(describe or provide URL of description):

Lineage Statement:
Otolith microstructural and microchemical analyses

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

These data were collected and processed in accordance with established protocols and best practices under the direction of the project's Principal Investigator. Contact the dataset Data Manager in section 3 for full QA/QC methodology.

6. Data Documentation

The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?

Yes

6.1.1. If metadata are non-existent or non-compliant, please explain:

6.2. Name of organization or facility providing metadata hosting:

NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:

https://www.fisheries.noaa.gov/inport/item/18610

6.4. Process for producing and maintaining metadata

(describe or provide URL of description):

Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access

NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

Yes

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:

Northwest Fisheries Science Center (NWFSC)

7.2.1. If data hosting service is needed, please indicate:

No

7.2.2. URL of data access service, if known:

https://www.webapps.nwfsc.noaa.gov/apex/parr/sampled_fish_pacific_hake/data/page/
https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/sampled_fish_pacific_ha

7.3. Data access methods or services offered:

At this time, contact the Data Manager for information on obtaining access to this data set. In the near future, the NWFSC will strive to provide all non-sensitive data resources as a web service in order to meet the NOAA Data Access Policy Directive (https://nosc.noaa.gov/EDMC/PD.DA.php).

7.4. Approximate delay between data collection and dissemination:

0 days

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

No Delay

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:

(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

NCEI_MD

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):

Northwest Fisheries Science Center - Seattle, WA

8.3. Approximate delay between data collection and submission to an archive facility:

365

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

The Northwest Fisheries Science Center facilitates backup and recovery of all data and IT components which are managed by IT Operations through the capture of static (point-in-time) backup data to physical media. Once data is captured to physical media (every 1-3 days), a duplicate is made and routinely (weekly) transported to an offsite archive facility where it is maintained throughout the data's applicable life-cycle.

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.